

SOLAR ENERGY

A. Mujiber Rahman



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Solar Energy

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Preface

Objective of the Book

Solar energy in one form or another is the source of nearly all energy on the earth. Humans, like all other animals and plants, rely on the sun for warmth and food. However, people also harness the sun's energy in many other different ways. For example, fossil fuels, plant matter from a past geological age, is used for transportation and electricity generation and is essentially just stored solar energy from millions of years ago. Similarly, biomass converts the sun's energy into a fuel, which can then be used for heat, transport or electricity. Realising its importance, almost all the universities in India are now introducing one-semester comprehensive courses on solar energy at the advanced undergraduate or beginning graduate level. This is a comprehensive text book covering the Solar Energy syllabus of B.Sc. (Physics).

The material and order of presentation

In this book '*Solar Energy*' the conversion of energy from sunlight into electricity, either directly using photovoltaics (PV), indirectly using concentrated solar power, or a combination, Wind Energy, Geothermal energy, Biomass, etc., are explained in five chapters to understand the basics about solar energy, wind energy, geothermal energy and biomass energy.

Chapter 1 deals with the basics of various forms of energy, renewable and non-renewable energy systems such as Coal, Oil and Natural gas.

Chapter 2 deals with solar energy, nature of solar radiation, Solar heaters, Crop drying and Space cooling.

Chapter 3 deals with solar ponds such as convective solar ponds, Non-convective solar ponds, Salt gradient ponds, different types of solar cookers, etc.

Chapter 4 expounds the basic concepts of various types of solar ponds, water desalination process, merits and demerits of photo voltaic cells.

Chapter 5 deals with basics of Geothermal energy, Wind Energy, Ocean Thermal Energy Conversion (OTEC), Energy from waves and tides, etc.

Chapter 6 deals with solar energy collectors such as flat-plate and concentrating collectors, merits and demerits of solar energy collectors, Solar selective coatings, etc.

Salient Features

- Written aiming 100 % coverage of Solar Energy syllabus of B.Sc. (Physics).
- Solar Energy concepts are explained in the clearest possible language.
- Typical questions are included at the end of each chapter.

It is hoped that this book will be found very useful by both students and teachers.

July, 2019

Dr. A. Mujiber Rahman

Acknowledgement

I thank my wife and children for their encouragement and support throughout the completion of this book. M/s Scitech Publications deserves all praise for having brought out this book in its excellent form in record time.

Any suggestions for improvement in the utility of the book will be very much appreciated.

July, 2019

Dr. A. Mujiber Rahman

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Dr. A. Mujiber Rahman received his M.Sc. degree in Physics from University of Madras. He joined as a Lecturer in the Department of Physics, Hajee Karutha Rowther Howdia College, Uthamapalayam in 2001. He has done his Ph.D degree in the field of Solar Astrophysics at School of Physics, Madurai Kamaraj University, Madurai, with the help of Radio Astronomy Centre (NCRA-TIFR), Ooty. He has presented many research papers in National and International conferences across the country. He has published several research papers in highly reputed UGC approved National and International Journals. He has been teaching Physics for the past 23 years. He has authored three books entitled on 'Introduction to Astrophysics', 'Concepts of Astrophysics' and 'Medical Physics' which are also recommend as a text books for the students of various Universities.



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